

N94-16393

GLOBAL AND REGIONAL/SEASONAL COLOR MOSAICS OF MARS; Alfred S. McEwen and Laurence A. Soderblom, U.S. Geological Survey, Flagstaff, Arizona

Four regional mosaics of Mars acquired during different seasons, along with their composite as a single global mosaic, have been completed in two colors (red and violet) at scales of 1/16 and 1/64 degrees/pixel. These mosaics were put together from a set of 51 separate mosaics (Table 1), each acquired from a single Viking Orbiter spacecraft orbital revolution [1,2]. Special techniques were developed and applied to suppress large variations between mosaics introduced by highly variable, optically thin, condensate hazes. The techniques utilize a combination of the spatial characteristics of the hazes (generally broad, low-frequency) along with their modulation of the regional color ratios (strongly enhancing the violet/red ratios). Photometric-function normalization was applied following the haze removal. Most of the single-orbit mosaics consist of red and violet or red, green, and violet filters, but a few mosaics with only red-filter data were included to fill gaps in global coverage at high northern latitudes. Global coverage is ~99% complete in red-filter mosaics and ~95% and ~60% complete in corresponding violet- and green-filter mosaics, respectively. All of the mosaics are geometrically tied to the 1/256° per pixel Mars Digital Image Map (MDIM), which is available on Compact Disk (CD), and which will be used as the base map for Mars Observer data sets. Early in 1993, the single-orbit color mosaics will be distributed to the science community in a six-volume set of CDs.

The global and regional/seasonal mosaics consist of the best color coverage of the surface available from each input data set. Where single-orbit mosaics overlap, we favored those with higher resolutions, more filters, lower observing angles (illumination, emission, and phase), relatively clear atmospheric conditions, and frost-free surface conditions. The four regional/seasonal groupings are not arbitrary categories. The Viking imaging team planned color imaging of broad regions during seasons when viewing conditions for the surface were generally best: the southern hemisphere during late southern summer, equatorial regions during early northern summer, and the north polar region during late northern summer.

Perhaps the most scientifically interesting parts of this dataset are the overlap regions, which show significant temporal variations in surface and atmospheric features [1]. Surface changes can be categorized as (1) changes that probably occurred during the great dust storms of 1977; (2) changes that occurred soon after the 1977 storms due to removal or redistribution of recently deposited dust; (3) changes in the northern lowlands that probably occurred during the dusty southern summer of 1979 (when no great dust storm occurred); and (4) changes associated with strong slope winds in the Tharsis and Elysium regions. We are looking forward to comparison of this dataset with wide-angle color images from the Mars Observer Camera [3].

1. McEwen, A.S., 1992, LPSC XXIII, 877-878.
2. Soderblom, L.A., 1992, in Kieffer et al., Mars, 557-593.
3. Malin, M.C., et al., 1992, JGR 97, 7699-7718.

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Table 1. Viking Orbiter Color Mosaics,
in Regional/Seasonal Groups

Group 1:
Southern Hemisphere/Late Southern Summer, 1977

REV	L _s	FILTERS	PHASE ANGLE (°)
425A	297	RGV	33
441A	326	RGV	50
447A	329	RGV	47
453A	332	RGV	43
459A	336	RGV	41
463A	338	RGV	36
469A	342	RGV	36
356B	314	RGV	73
358B	315	RGV	66
407B	341	RGV	85

Group 2:
Equatorial/Early Northern Summer, 1978

REV	L _s	FILTERS	PHASE ANGLE (°)
577A	33	RGV	20
583A	36	RGV	19
586A	38	RGV	22
590A	40	RV	24
593A	41	RGV	21
605A	46	RV	26
609A	48	RGV	27
614A	50	RGV	29
663A	72	RGV	46
666A	73	RGV	47
669A	74	RGV	49
672A	76	RGV	50
681A	80	RGV	53
684A	81	RGV	55
687A	82	RGV	55
690A	84	RGV	56
735A	104	RGV	62

Group 3:
North Polar/Late Northern Summer, 1978

REV	L _s	FILTERS	PHASE ANGLE (°)
717A	96	RV	13
747A	109	RV	23
756A	113	RV	26
762A	116	R	25
765A	118	RV	46
768A	119	RV	48
771A	120	RV	49
793A	131	R	70
797A	132	R	72
801A	134	R	74
808A	138	R	77
811A	139	R	79
814A	141	R	79
816A	142	R	80
818A	143	R	81
826A	147	R	85

Group 4:
Survey Mission (Global)/Northern Summer, 1979

REV	L _s	FILTERS	PHASE ANGLE (°)
323S	65	RV	35
333S	69	RV	50
334S	70	RV	35
347S	75	RV	40
353S	78	RV	58
378S	89	RV	55
426S	111	RV	58
483S	140	RGV	81